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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

LERNER, MARTIN

ART UNIT

PAPER NUMBER

2654

DATE MAILED: 08/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/806,756

Applicant(s)

LUBIARZ ET AL.

Examiner

Martin Lerner

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 May 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 to 13 and 16 to 38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 to 4, 11 to 13, 16 to 18, 25 to 30, and 37 to 38 is/are rejected.
- 7) ☒ Claim(s) 5 to 10, 19 to 24, and 31 to 36 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Specification

1. This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.

2. The disclosure is objected to because of the following informalities:

There are no section headings. Under conventional patent practice in the United States, section headings are "Background of the Invention", "Summary of the Invention", "Brief Description of the Drawings", and "Detailed Description of the Preferred Embodiments".

On page 6, line 19, "steps 182 to 184" should be —steps 185 to 187—. (See Figure 3.)

Appropriate correction is required.

Claim Objections

3. Claims 10, 24, 29, 30, and 36 are objected to because of the following informalities:

Claims 10, 24, and 36 should depend upon claims 5, 19, and 31, respectively, not upon independent claims 1, 13, and 27, respectively. Each of claims 10, 24, and 36 contains the limitation of "the first and second fractions", which limitation is not found in

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any of independent claims 1, 13, and 27. The limitation of "the first and second fractions" is found in each of claims 5, 19, and 31.

Claims 29 and 30 should depend upon independent claim 27, not upon independent claim 1. Independent claim 27 recites a preamble of "a computer program product", but independent claim 1 recites a preamble of "a method for detecting voice activity". Claims 29 and 30 recite a preamble of "a computer program product", so claims 29 and 30 are properly dependent upon independent claim 27, not upon independent claim 1.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

5. Claims 1 to 4, 11, 13, 16 to 18, 25, 27 to 30, and 37 are rejected under 35 U.S.C. 102(a) as being anticipated by *Lockwood et al. (WO '737)*.

Note: The inventive entities are not identical, so 35 U.S.C. 102(a) applies as an invention "by others". *Lockwood et al. (WO '737)* is relied upon for the rejection. However, for purposes of convenience, citations to columns and line numbers are with respect to *Lockwood et al. ('380)*, which is a certified translation of *Lockwood et al. (WO*

'737) in English. *Lockwood et al.* ('380) claims priority with respect to *Lockwood et al.* (WO '737).

Regarding independent claims 1, 13, and 27, *Lockwood et al.* (WO '737) discloses a method, device, and computer program product for detecting speech activity, wherein;

"the voice activity is detected on the basis of an analysis comprising the step of comparing two different versions of the speech signal, wherein at least one of said versions is a denoised version obtained by taking account of estimates of noise included in the signal" – speech detection states are determined on the basis of the difference $ba_i - bi_i$; ba_i and bi_i are "two different versions of the speech signal" because they are derived from the quantities $\Delta E_{n,i}$ and $E_{n,i}(\text{bar})$; in turn, $\Delta E_{n,i}$ and $E_{n,i}(\text{bar})$ are both derived from $E_{n,i}$, which is the energy of the noise-suppressed signal for each of the energy bands for band subscript i and for frame subscript n ; thus, both $\Delta E_{n,i}$ and $E_{n,i}(\text{bar})$, and it follows, ba_i and bi_i , are denoised versions of the speech signal; the subtraction quantity $ba_i - bi_i$ is a difference, which involves "comparing two different versions of the speech signal"; $\Delta E_{n,i}$ and $E_{n,i}(\text{bar})$ are derived from $E_{n,i}$'s, and $E_{n,i} = E_{p_{n,i}}^2(\text{hat})$, where $E_{p_{n,i}}(\text{hat})$ is "a denoised version obtained by taking account of estimate of noise included in the signal" by Equation (3), as $E_{p_{n,i}}(\text{hat})$ subtracts noise estimates $B_{n-T1,i}(\text{hat})$ (column 3, line 4 to column 4, line 12: Figures 1 to 4).

Regarding claims 2, 16, and 28, *Lockwood et al.* (WO '737) discloses speech detection states are determined on the basis of the difference $ba_i - bi_i$; ba_i and bi_i are respective energies, evaluated in at least one frequency band, because ba_i and bi_i are

based upon energy $E_{n,i}$'s, and energies $\Delta E_{n,i}$ and $E_{n,i}$ (bar), where energy $E_{n,i}$ equals magnitude spectral component $E_{p_{n,i}}^2$ (hat); subscript i denotes each frequency band of the quantities ba_i and bi_i (column 3, lines 16 to 22; column 3, line 45 to column 4, line 12: Figures 1 to 4).

Regarding claims 3, 17, and 29, *Lockwood et al. (WO '737)* discloses $E_{n,i}$ (bar) is a smoothed long-term energy computed using a forgetting factor B1 (column 3, lines 33 to 36: Figure 2: Step 33); ba_i is set equal to smoothed value $E_{n,i}$ (bar) at certain points in time (column 3, lines 45 to 53: Figure 3: Step 28); bi_i is also a function of $E_{n,i}$ (bar) by Equation (4) (column 3, lines 53 to 65: Figure 3: Step 33); thus, the comparison of taking the difference $ba_i - bi_i$ involves "a comparison between the energy of said smoothed version and the smooth energy."

Regarding claims 4, 18, and 30, *Lockwood et al. (WO '737)* discloses an automaton for transitioning between states of speech activity (column 4, lines 13 to 35: Figure 4); transition between states is based upon comparison of $ba_i - bi_i$ to threshold ϵ_2 to obtain p_i , where p_i determines a state δ_n , by comparison of p_i to thresholds SE1 to SE4; state $\delta = 0$ corresponds to a silence state and state $\delta = 2$ corresponds to a speech state (column 3, line 65 to column 4, line 35: Figures 3 and 4).

Regarding claims 11, 25, and 37, *Lockwood et al. (WO '737)* discloses ba_i and bi_i are based upon energy $E_{n,i}$'s, and energies $\Delta E_{n,i}$ and $E_{n,i}$ (bar), where energy $E_{n,i}$ equals magnitude spectral component $E_{p_{n,i}}^2$ (hat); subscript i denotes each frequency band of the quantities ba_i and bi_i ; the difference $ba_i - bi_i$ is compared to threshold ϵ_2 , which is "a

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lower bound of the energy" (column 3, lines 16 to 22; column 3, line 45 to column 4, line 12: Figures 1 to 4).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 12, 26, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Lockwood et al.* (WO '737) in view of *Ertem et al.*

Lockwood et al. (WO '737) does not disclose that one of the two different versions of the speech signal is a non-denoised version of the speech signal, as both ba_i and bi_i are derived from energy $E_{n,i}$ and spectral components $Ep_{n,i}$ (hat), where $Ep_{n,i}$ (hat) is a denoised version of the speech signal. (Column 3, Lines 4 to 23: Figure 2)

However, *Ertem et al.* teaches a related method of noise reduction for speech, where a VAD decision, or speech activity decision, is based upon a comparison of signal energy 46 to a VAD threshold 44, by Equation (1). (Column 2, Lines 2 to 12: Figures 4, 5, and 10) The speech energy is calculated by an adaptively filtered version 46, which reduces the noise content of the input signal so that a more accurate energy value can be used in the VAD decision 42. (Column 5, Lines 20 to 27: Figures 4, 5, and 10) However, threshold adaptation 44 is not directly based upon an adaptively filtered energy computation, but depends upon many signal variables. (Column 5, Lines 27 to 42:

Figures 4, 5, and 10). *Ertem et al.* suggests a method of noise reduction that overcomes a number of disadvantages including reduced intelligibility, listener fatigue, and degraded compression, so that voice activity detection is reliable and robust. (Column 1, Lines 45 to 65) It would have been obvious to one having ordinary skill in the art to provide a speech activity detection method that compares a denoised version of a speech signal with a non-denoised version of a speech signal as suggested by *Ertem et al.* in the method for detecting speech activity of *Lockwood et al.* (WO '737) for the purpose of making it more reliable and robust.

Allowable Subject Matter

8. Claims 5 to 9, 19 to 23, and 31 to 35 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
9. Claims 10, 24, and 36 would be allowable if rewritten to overcome the objections thereto, and to include all of the limitations of the base claim and any intervening claims.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to Applicants' disclosure.

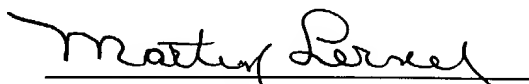
Lockwood et al. ('489), Ashley, Anderson et al., Garner et al., Laurent, and Selbach et al. disclose related art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Lerner whose telephone number is (703) 308-9064. The examiner can normally be reached on 8:30 AM to 6:00 PM Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (703) 305-9645. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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7/28/04


Martin Lerner
Examiner
Group Art Unit 2654